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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,800	01/24/2004	Larry S. Eoff	2003-IP-009464U1	1654

71407 7590 01/14/2008  
ROBERT A. KENT  
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DUNCAN, OK 73536

EXAMINER
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FIGUEROA, JOHN J

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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01/14/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ROBERT.KENT1@HALLIBURTON.COM  
Tammy.Knight@Halliburton.com

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/763,800	EOFF ET AL.	
	Examiner	Art Unit	
	John J. Figueroa	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1, 3-5, 10-14, 21, 24-29, 100-106, 109-127, 130-145, 147 and 149-154 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 10-14, 21, 24-29, 100-106, 109-127, 130-145, 147 and 149-154 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/29/07, 11/28/07 &amp; 12/20/07</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. Receipt is acknowledged of a request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e) and a submission (amendment), filed on October 22, 2007. The request has been deemed proper and this application has been hereby examined in view of said amendment

### ***Response to Amendment***

2. The 35 U.S.C. 102(b) rejection of claims 106, 108-111, 117, 119, 120, 123-127, 129-132, 138, 140, 141, 144 and 145 as anticipated by United States Patent Number (USPN) 4,532,052 to Weaver et al. (hereinafter 'Weaver') previously made of record in item 2 on page 2 of the Final Office Action mailed July 24, 2007 (hereinafter 'FOA') has been withdrawn in view of Applicant's amendment to the claims in the response to FOA filed with RCE on October 22, 2007 (hereinafter 'Response').

3. The 35 U.S.C. 103(a) rejection of claims 7-14 and 28-30 as unpatentable over Weaver in view of USPN 3,271,307 to Dickson et al. (hereinafter 'Dickson') that was previously made of record in item 7 on page 3 of FOA has been withdrawn in view of Applicant's amendment to the claims in Response.

***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 3-5, 10-14, 21, 24-29, 100-106, 109-127, 130-145, 147 and 149-154 are rejected under 35 U.S.C. 102(b) unpatentable over Dickson in view of Weaver.

Dickson discloses branched polyalkylene polyamines that are additives in aqueous fluid compositions for treatments of subterranean oil formations (particularly in fracturing oil wells by using pressure, see col. 43-47), said branched polyalkylene polyamines having a backbone base polyamine (or derivative thereof) hydrophilic polymer and an alkylene branch that can be, e.g., butylene (4 carbons) or other homologs, straight-chained or branched. (Col. 1, lines 13-50; col. 2, line 16 to col. 3, line 5) These compounds can undergo acylation (to form, e.g., acrylate or methacrylate derivatives); can be reacted with an alkenyl succinic acid derivative (col. 3, lines 50-68; col. 5, lines 8-55; col. 6, lines 43-73); amidification that can provide amino pendant groups (col. 7, line 62 to col. 8, line 24); and/or can undergo alkylation/oxyalkylation (to form, e.g., a polyetheramine that can have a hydrophobic branch having primary, secondary or tertiary amines) with, e.g., an alkylating agent, butylenes oxide or octylene oxide (col. 10, lines 1-16; col. 15, lines 56-66; col. 19, lines 25-59; col. 21, lines 1-23; col. 24, lines 39-53; Table II; Examples 1-3). The alkylating agent can be an alkyl halide, such as n-butyl chloride, n-hexyl iodide or octadecyl bromide, which would

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provide hydrophobically-branched polyamines having alkyl branches of 4, 6 and 18 carbons, respectively, with no intervening heteroatoms. (Col. 19, lines 25-59)

Dickson also discloses increasing the molecular weights of these branched polyamines through carbonylation, wherein the carbonyl reactant reacts intermolecularly to act as a bridging means between two or more polyamino monomers/compounds, thus increasing the molecular weight of the polyamines. (Col. 29, lines 5-18)

In Example 5 and Table 6, Dickson discloses examples/results from alkylating a polyamine homopolymer to obtain hydrophobically-modified branched polyamines.

Furthermore, Dickson discloses that these branched compounds have numerous uses in processes involving water flooding in a subterranean formation and have several advantages, such as not forming precipitates, good anti-corrosion properties and having strong bactericidal action. (Col. 31, line 72 to col. 32, lines 39) These compounds are stable reagents even in the presence of acids and, thus, can be applied satisfactorily to wells that have been acidized with hydrochloric or hydrofluoric acid. (Col. 41, lines 9-20; col. 50, 52-63)

In columns 37-43, Dickson further discloses examples whereby an aqueous treatment solution, having dispersed therein 5-25% by wt. of the aforementioned compounds, can be injected into a well that has been acidized to remove mud sheath from the interior of the well. These compositions can include surface-active agents (surfactants), although the disclosed polymers themselves can impart detergent/wettability properties to the treatment solution. The well is usually shut down for a few hours following treatment before production is resumed. (Col. 31, line 72 to

col. 32; line 28; col. 37, lines 57-58; col. 38, lines 48-63; col. 41, lines 10-20 and 50-75;

Example on col. 42; claims 1-8)

In other examples, Dickson discloses injecting the branched compounds in a treatment solution to fracture the formation. (Columns 43-47) Aqueous formation treatment compositions containing these water-soluble branched polymer compounds can further include natural clays, weighting agents, gel-forming viscosifiers and/or stabilizers, which can improve viscosity and gel-forming characteristics. (Col. 38, line 64 to col. 39, line 11)

Although Dickson may not explicitly disclose all the physical properties of the disclosed branched polymer compounds, or compositions comprising thereof, that are recited in the claims (such as regarding permeability properties) because the water-soluble branched polymers/compositions disclosed by Dickson are encompassed by the water-soluble branched polymers/compositions recited in the method of the instant claims, then they must inherently possess the same physical properties, such as stabilizing a subterranean formation.

Dickson does not expressly disclose the molecular weight of the resultant branched polymers to be about 100,000 to about 10,000,000. .

Weaver teaches a method for treating a subterranean formation to substantially alter the fluid flow (permeability) and/or surface characteristics of the formation, said method including injecting into the formation an aqueous composition that can alter the properties of organic/aqueous fluids, said composition containing a branched water-soluble organic polymer containing unit(s), having a high molecular weight of 900 to

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50,000,000, that can be hydrophilic, hydrophobic or a combination thereof. (Abstract; col. 5, lines 1-10 and 30-65; col. 6, lines 29-65; col. 7, lines 7-33; col. 9, lines 32-37 and 49-63; col. 20, line 65 to col. 21, line 6; col. 21, lines 49-63; col. 38, lines 37-51; col. 39, lines 24-36; *See particularly*, col. 8, lines 41-67; *See also*, Table 6 on col. 53-54 disclosing data of aqueous fluid diverting and water permeability reduction properties for an aqueous fluid containing a methoxypolyethylene oxide branched polydimethylaminoethyl methacrylate copolymer, sand, silica flour and bentonite)

Weaver teaches examples of using fluids containing a hydrophilic polymer modified with hydrophobic branches having desired hydrophobic-hydrophilic to treat a subterranean oil formation to alter the surface characteristic of the formation, the fluid flow and/or resistance to flow relative to a particular fluid, wherein the hydrophilic nature of the branched polymer serves as an aqueous gelling agent that provides for an increase in fluid viscosity. (Col. 5, lines 11-16; col. 6, line 65 to col. 7, line 40; col. 7, line 63 to col. 8, line 21; col. 10, lines 56-59; Table on col. 9-10) In Tables 23-28, Weaver discloses data for examples of treating a well by injecting into the well an aqueous solution containing a hydrophilic polymer with nonionic branches.

Weaver teaches that the water-soluble branched polymer can have, in its backbone chain and/or in its branch chain, one or more heteroatom or groups, such as nitrogen (e.g., polyamine). (Col. 14, lines 17-23 and 52-59) The polymer units in either chain can be  $-R-X-$ , wherein R is a  $C_1$  to  $C_6$  alkyl radical and X represents a heteroatom and are preferably capped. (Col. 19, lines 36-65) Particularly, branched polymers containing polyamine and polyether linkages in the branches are preferred for altering

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fluid flow properties in the formation and are especially effective and stable at temperatures above 177°C. (Col. 13, lines 1-18)

Among the monomers disclosed in Weaver that can be used to form the branched polymer having the desired hydrophilic-hydrophobic property include dimethylaminoethyl methacrylate. (Col. 19, lines 7-10; col. 19, line 66 to col. 20, line 29; col. 22, lines 47-65)

Therefore, it would have been obvious to a person of ordinary skill in the art at the time that the invention was made to use the high-molecular weight branched polyamine compounds as the hydrophobically-modified hydrophilic polyamine injected in the fluid used in Dickson's method of treating a subterranean formation. It would have been obvious for one skilled in the art to do so to attain a more efficient oil treatment method having the ability to control fluid flow properties/surface characteristics of a particular formation surface by using the resultant aqueous fluid (with the high molecular weight branched polyamine), thereby attaining a desired level of surface permeability of the subterranean formation as taught by Weaver.

Thus, the instant claims are unpatentable over Dickson and Weaver.

### ***Response to Arguments***

#### ***The 35 U.S.C. 102(b) Rejection over Weaver (item 2 of OA)***

6. Applicant's arguments presented in the "Remarks" section submitted with RCE regarding the captioned 35 U.S.C. 102 rejection as anticipated by Weaver' have been



fully considered and deemed persuasive in view of Applicant's amendment to the claims limiting the molecular weight of the water-soluble polymer to be 100,000 to 10 million.

*The 35 U.S.C. 103(a) Rejection over Weaver in view of Dickson (item 7 of FOA)*

7. Applicant's arguments presented in the "Remarks" section submitted with RCE regarding the captioned 35 U.S.C. 102 rejection as unpatentable over Weaver in view of Dickson have been fully considered but deemed moot in view of the withdrawal of the instant rejection in favor of the new grounds of rejection discussed above.

***Conclusion***

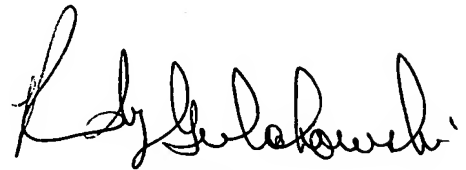
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Figueroa whose telephone number is (571) 272-8916. The examiner can normally be reached on Monday-Thursday 8:00-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JJF/RAG

A handwritten signature in black ink, appearing to read "Randy Gulakowski", is positioned above the printed name and title.

RANDY GULAKOWSKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700